17

IN THE UNITED STATES PATENT AND TRADEMRK OFFICE

In re Application of

IKESHIMA, Koichi Group Art Unit: 1774

Serial Number : 09/803,941 Examiner : Tamra L. Dicus

Filed : May 13, 2001

For : CERAMIC HONEYCOMB STRUCTURE

DECLARATION

Commissioner for Patent
Washington, D. C. 20231

Sir :

IKESHIMA, Koichi, a citizen of Japan, residing at c/o NGK Insulators, LTD., 2–56, Suda-cho, Mizuho-ku Nagoya–city, Aichi-Prefecture, 467-8530, Japan declare:

That he is a sole inventor of the above-identified application;

That he is familiar with the prosecution history of the above-identified application;

That he has compiled the following statement after his reading US Patent No. 4,849,275 by Hamaguchi et al. and US Patent No. 5,514,446 by Machida et al. in order to prove the reason why the products obtained by the methods disclosed in those prior art references

fails the requirements of the present invention. Furthermore, he has carried out the following experiments to demonstrate the difference in the thermal expansion coefficient between the outer circumferential wall portion, intermediate portion and central portion among the honeycomb structures produced by the methods disclosed by Kumazawa, Kotani, Hamaguchi et al. and Machida et al. in comparison with those of the present invention.

1. HONEYCOMB STRUCTURURAL BODY OBTAINED BY METHOD DISCLOSED BY HAMAGUCHI ET AL.

According to the description on Column 6, Lines 30 to 33 of US Patent No. 4,849,275 Specification, five honeycomb structural bodies in each of Run Nos. 1 to 13 were immersed 20 (l)* of the thus obtained slurry for 2 minutes. It is quite clear that the whole portions of all of the five honeycomb structural bodies per each run could be immersed in the slurry having a volume of 20 l in an appropriate vessel, judging from size of the honeycomb structural body described therein.

Thereafter, excess slurry on each body was blown off in air stream, as is described on Column 6, Line 33 of the '275.

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* Declarant's remarks: The volume of slurry used should be 20 liters, as is described in the laid-open specification of the basic Japanese Patent Application filed on February 3, 1988.

The attached Exhibit A is an illustrative showing to demonstrate how the honeycomb structural body is immersed in slurry.

Accordingly, the whole surfaces of the honeycomb structural body inclusive of the internal wall surfaces and the most outer peripheral wall surface are coated with the slurry under the same conditions. Thus, it is quite apparent that no difference can be seen between the internal walls and the most outer peripheral walls in the thermal expansion coefficient.

2. HONEYCOMB STRUCTURAL BODY OBTAINED BY METHOD DISCLOSED BY MACHIDA ET AL.

According to the description on Column 3, Lines 37 to 42 of US Patent No. 5,514,446 Specification, only incomplete cells having an area not more than 90 % are coated with a ceramic material. Thus, only the hatched cells labeled with 2b in Fig. 1 thereof are coated with a ceramic material in the peripheral wall portions. Therefore, the outermost peripheral wall is coated in a discontinuous manner, as can be taken easily form the Figs. 1 to 3 of the '446.

It is quite clear that the effect of the present invention can not be attained in the honeycomb structural body produced according to the method disclosed by Machida et al. In fact, we have obtained the following data, when the experiment is carried out by using the honeycomb structural body produced according to the method disclosed by Machida et al.:

3. RESULTS OF DETERMINATION OF THERMAL EXPANSION COEFFICIENTS IN SPECIFIED PORTIONS

(A) Methodology & Results

The honeycomb structures classified as 7/400 as the same one used in Example 5 of the present application were produced by the methods disclosed by, Kumazawa, Hamaguchi et al., and Machida et al., respectively. The thermal expansion coefficients in the outer circumferential wall portion, the intermediate portion and the central portion were measured using thus prepared honeycomb structures and the catalysts prepared from those structures by immersing method. The results thereof are shown in Table 1 below.

Table 1

Thermal expansion Coefficient (10^{-6}/℃) *2							
	Portion determined	Present invention	Kumazawa	Kotani	Hamaguchi et al.	Machida et al.	
Honeycomb body	Outer*1	1.65, 1.68	0.49, 0.54	1.55, 1.63	0.48, 0.49	Portion A*3 0.50, 0.52	Portion B*3 1.48,1.52
	Intermediate	0.49, 0.49	0.50, 0.51	0.50, 0.52	0.48, 0.53	0.48, 0.51	
	Central	0.51, 0.54	0.50, 0.53	0.49, 0.53	0.49, 0.55	0.50, 0.55	
Catalyst	Outer*1	1.92, 1.96	1.09, 1.20	1.85, 1.93	1.07, 1.15	Portion A*3 1.12, 1.13	Portion B*3 1.84, 1.97
	Intermediate	1.12, 1.18	1.11, 1.15	1.10, 1.15	1.13, 1.16	1.13, 1.15	
	Central	1.11, 1.16	1.13, 1.13	1.14, 1.17	1.12, 1.14	1.12, 1.17	

Remarks:

*1: The word "Outer" stands for the outer circumferential wall portion.

*2: The determination of the thermal expansion coefficient was carried out by using two specimens; and thus obtained data were shown, respectively in Table 1 above.

*3: Portion A means the complete cell and no being sealed and Portion B means the incomplete cell and being sealed with ceramic material.

(B) Discussion

The thermal expansion coefficients of the products produced by Kumazawa, Hamaguchi et al., and Machida et al. showed in principle no practical difference among the outer circumferential wall portion, the intermediate portion and the central portion, except the B Portion in Machida et al. In the case of Machida et al., no practical stress could not be expected since the portions having higher thermal expansion coefficient in the outer circumferential wall portion were discontinued at the B portions, like a discontinued link.

In case of the present invention and Kotani, there was observed a big difference in the thermal expansion coefficient between the central portion and the circumferential wall portion.

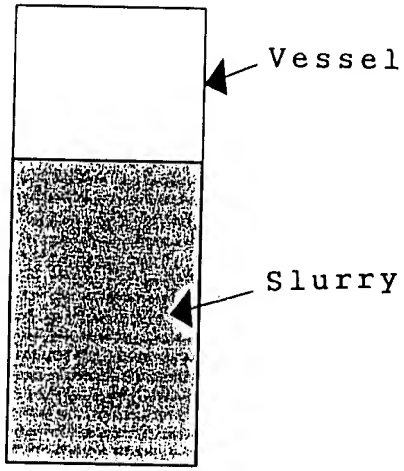
However, the declarant has realized that the stress can be given from the outer circumferential wall portion to the central portion only in the case that the shrinkage due to the temperature change of the product itself after firing occurs. Thus, in the case of the honeycomb structures obtained according to the method disclosed by Kotani, there is no room of giving substantial stress to the inner portion from the outer cicumferential wall portion since the inner portion has been fired and become hard before the outer circumferentail wall portion is coated after removing the distorted cells in the outer peripheral portions.

The undersigned declarant declares further that all the statements made herein of his own knowledge are true and that all the statements made on information and belief are to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the united States code and that such false statement may jeopardize the validity of the application or any patent issuing thereon.

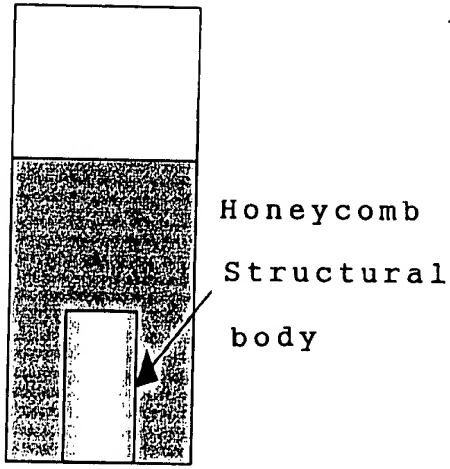
Signed this 10 th day of July, 2003

Koichi Ikeshima

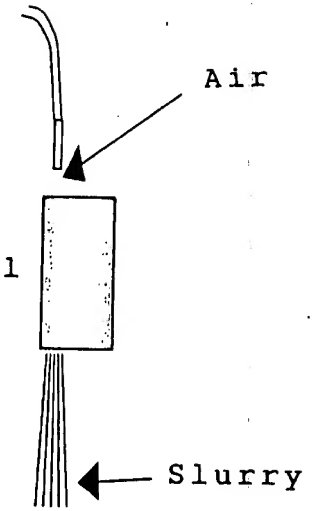
IKESHIMA, Koichi



Step 1:
Preparation
of slurry



Step 2:
Immersing the body
into slurry



Step 3:
Blowing off
of excess slurry

Exhibit A